OTS: 60-41,711

JPRS: 4145

28 October 1960

HAND CRANK BRICK-LAYING MACHINE
* * *
"STREAMLINED" FOR REINFORCEMENT BINDING

- COMMUNIST CHINA -

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WASHINGTON 25, D. C.

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WASHINGTON 25, D. C.

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JPRS: 4145

CSO: 1034-S/c

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- COMMUNIST CHINA -

[Following is the translation of an article written by the Building-Construction Engineering Bureau, Hsu-ch'ang Special District, in Kung-ch'eng Chien-she (Engineering Construction), Peiping, No. 8, 15 April 1960, page 10.]

I. Structure

The length of the brick laying machine is 120 centimeters, the highest part is 35 centimeters and the lowest is 27 centimeters. Its principal structure can be divided into five parts:

(1) The hod: It is a slanting cylinder. After the pressure and precipitate of the mortar were considered, the slanting cylinder was deemed more suitable because this cylinder can spread either thin or thick mortar. At the same time, at the lower part of the hod there is installed a mortar roller, which is enclosed from all sides. As such, the machine spreads the mortar only when it is in operation and ceases as soon as the machine is stopped. The even more outstanding fact is that when the bricks are laid, they are solidly set with mortar.

(2) The brick laying part: This part utilize the movable brick sliding axis and the pressure of the brick itself for brick laying. The brick sliding axis is set at 40°. The most obvious fact is that the machine has complete control over the bricks: horizontal or vertical, the bricks are all evenly laid and wall surfaces are kept smooth.

(3) The straightening part: There is a spring installed behind the board on each side of the internal compartment of the trough. Before the brick is spread

with mortar, it is straightened on its sides so that when the brick reaches the wall, it is straight and even. At the same time, there is a stopping board to set the brick straight so that they will be laid lengthwise on the wall. When this board is taken off, the bricks will be laid crosswise on the wall.

(4) The supporting part: The machine has two supports. When the machine is operated, its front support is on the unfinished wall. At the same time, it rotates the mortar roller at the lower part of the hod, which releases the mortar and the roller spreads it on the wall. The aft support runs on the finished wall. The weight of the machine itself presses the bricks so that they become evenly and solidly set.

(5) The clamp rollers: Two rollers, one on each side, clamp on the wall, to insure the machine moving along the wall in a vertical position; at the same time, these rollers also insure that the two surfaces of the wall will be even and straight.

II. Characteristics

(1) Simple structure and low production cost: the machine can be made in two days. As to materials used, with the exception of 0.2 square meter of 1.5 millimeter black iron plate and 4 pieces of 25 millimeter steel pipe, all parts are made of wood. The production cost per machine is 20~30 yuan.

(2) The machine can be used easily and conveniently over long or short walls, clear-water or muddy-water walls, internal or external walls and under conditions where there are complicated scaffold and gangway structures, in high or low altitude. It is especially suitable for building industrial plant facilities and large building engineering projects.

(3) The machine does the work in four procedures. No one is needed to spread the mortar, to lay the bricks, to complete the pointing and to straighten the wall face nor does it need any line. At the same time, the machine insures that both faces of the wall are smooth.

(4) Efficiency: The machine saves a great amount of labor, reduces the vigor of the work and increases labor efficiency. It can lay 45,000 to 50,000 bricks a day. If the brick sliding part can be improved, the number of bricks laid per day may be increased to 60,000 to 65,000. Compared to the average efficiency (2,500 bricks) now prevailing in the Building-Construction Engineering Bureau, the machine's efficiency shows a 31 times increase.

The most outstanding fact is that the machine needs only one skilled worker with the assistance of 2~3 strong workers to operate it. Even new workers can participate in brick laying.

(5) Labor assignment and operating method: The body of the machine is small and occupies a small area. Three workers (one skilled laborer and two strong workers can operate the machine, with one transporting the brick one piling them and one cranking the machine.

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[Following is the translation of an article written by the Tientsin Building-Construction Engineering Bureau, Kung-ch'eng Chien-she (Engineering Construction), Peiping, No 8, 15 April 1960, pp 33-34.]

Recently, the Chinese Communist Tientsin Municipal Construction Commission's Technical Revolution Office held a technical reform and technical revolution mobilization tournament for the construction system in Tientsin. During the meeting, workers and technicians were organized to observe and emulate and to scrutinize the reinforcement binding machines at the tournament.

Based on the principles of combining foreign and native methods, convenient transportation, suitable durability, easy material sources, and low production cost, the meeting selected 13 types of relatively better machines. And in accordance with production technical needs and working conditions in the medium and small workshops, these machines were combined into a streamlined organization.

The principal steps in the streamlined technique of reinforcement binding include the procedures of straightening, cutting, and form making. Its technical process is shown in Figure 1.

According to actual operating conditions, this set of equipment requires 14-16 workers to operate and can process 10 tons of ϕ14 steel materials per day.

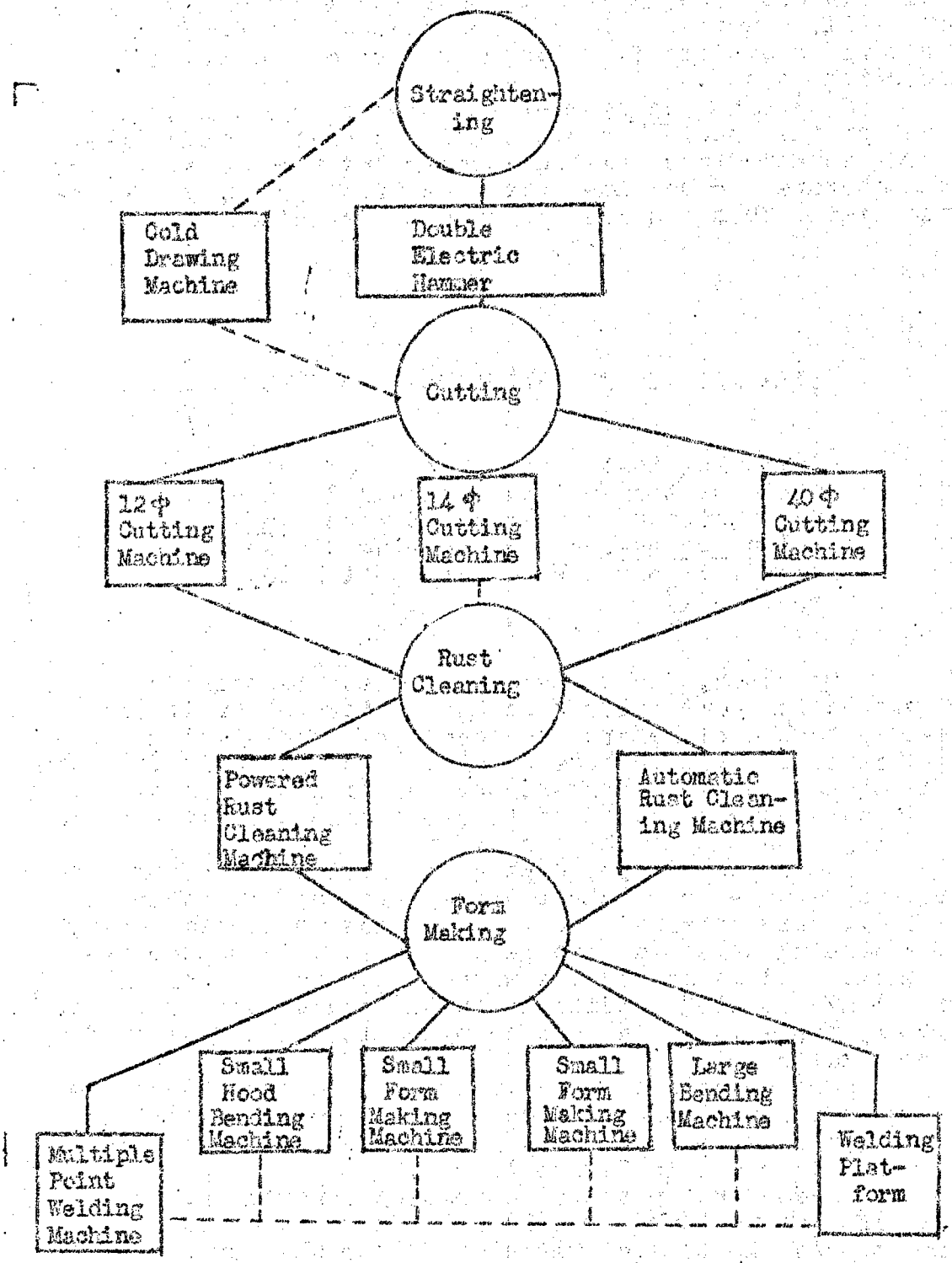

Figure 1

Technical Process of Streamlined Reinforcement Binding

Compared to production before the streamlined organization, the efficiency rate has risen 2-3 times and eliminated 4-6 workers.

Now, the following is a brief description of this set of equipment and the structure of the machines:

1. Double Electric Hammer

The double electric hammer is composed of a steel frame and two steel hammer heads. The steel frame is made by welding together a number of angle steel bars. Each steel hammer head is made by welding together some scrap steel. The apparatus is run by a motor and a leather strap. After the switch is turned on, two workers operate the apparatus by holding a spring control. The scope of steel straightening ranges from ϕ14-40. Each shift of workers can straighten 10 tons of steel per machine.

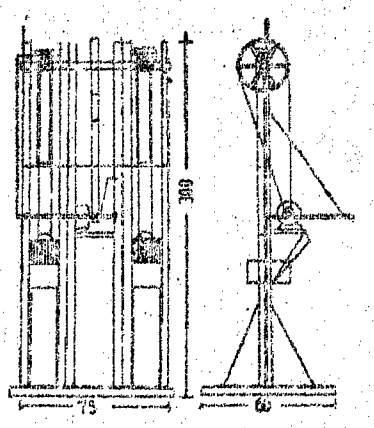

Figure 2 Double Electric Hammer

2. ϕ12 Millimeter Cutting Machine

This type of cutting machine can cut steel materials within the ϕ12 millimeter measurement. Its structure is simple. The machine is made of round steel bars and steel plates, as shown in Figure 3. For operation, two workers just place the steel material to the cutting edge of the machine. Each machine can cut 5 tons of steel per shift. It has an efficiency three times greater than that of a manual operation.

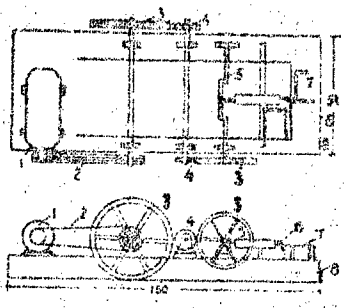

Figure 3 φ12 Millimeter Cutting Machine

1-motor; 2-triangular leather belt; 3-large gear; 4-small gear; 5-crank shaft; 6-shears; 7-steel plate; 8-platform

3. φ14 Millimeter Cutting Machine

This type of cutting machine can cut steel materi. within the φ14 millimeter measurement. The cutting is done by merely placing the material at the edge of the shears. This machine is made with old scrap steel mater ais, as shown in Figure 4. Two workers are required for its operation and its daily production is 5 tons of stee per machine.

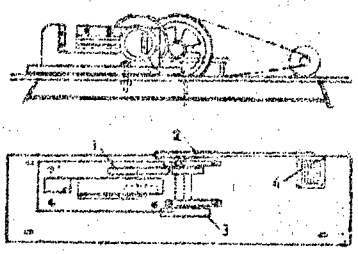

Figure 4 φ14 Millimeter Cutting Machine

1- 50 centimeter belt wheel; 2-10~50 tooth wheel one group; 3-driver wheel (40-35 kilograms).

4. φ40 Millimeter Cutting Machine

The φ40 millimeter cutting machine is used especially for cutting heavy steel materials. It can be made from old scrap steel materials and a wooden platform added, as shown in Figure 5. Each shift requires three workers, who can cut 600 pieces of steel per machine.

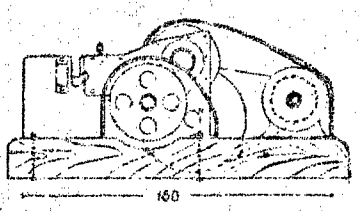

Figure 5 φ40 Millimeter Cutting Machine

5. Electrically Powered Rust Cleaning Machine

The electrically-powered rust cleaning machine is principally made of wooden materials, as shown in Figure 6. Its middle shaft is made of φ40 millimeter steel bar. The steel wire brush is tied to the trough-like part of the machine. Switch on the motor and the rust cleaning operation is done by two workers, who can clean a daily 5 tons of steel per machine. The machine has a working efficiency 4-5 times greater than that of manual labor.

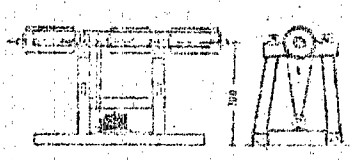

Figure 6
Electrically-Powered Rust Cleaning Machine

6. Automatic Rust Cleaning Machine

The automatic rust cleaning machine is made up of a wooden frame, needle cloth (or steel wire brush), wheel pressure handle, hollow shaft, etc. Its structure is shown in Figure 7.

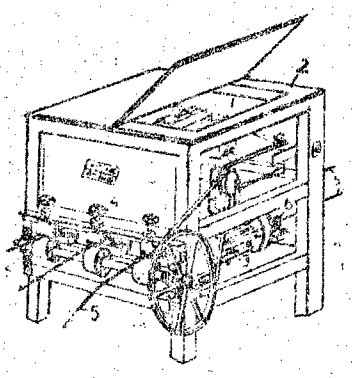

Figure 7
Automatic Rust Cleaning Machine

1-motor; 2-wooden frame; 3-needle cloth; 4-wheel pressure handle; 5-steel bars; 6-hollow shaft.

This type of processing machine can clean rust automatically, by merely placing the material on the roller. Each shift of workers can process 10 tons of steel materials per machine.

7. Large Bending Machine

In bending ϕ8-40 millimeter steel materials, a large bending machine may be used, as shown in Figure 8. The figure on the right shows the mechanical structure the machine. In processing, merely put the steel material on the working platform, adjust the eccentric shaft and the steel material will be bent. Generally, the operation is done by two workers. Efficiency can be raise 4—5 times. In bending over 20 meter long steel bars, each machine can process more than 500 pieces per shift of workers.

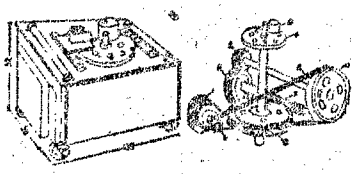

Figure 8 Large Bending Machine
1-motor; 2-small leather belt wheel; 3-triangular

leather belt; 4-large leather belt wheel; 5-small gear; 6-large gear; 7-snail rod; 8-snail wheel; 9-working disc; 10-eccentric shaft tube.

8. Small Form Making Machine

There are two types of small form making machines. The first type has been adopted by the Lu-shan Youth Shock Brigade in the processing plant of the No. 6 Construction Company in Tientsin. Its structure is shown in Figure 9. It is suitable for processing ϕ4~10 millimeter steel materials. In operation, just place the steel material between the movable pincers and the steel post and the bending will be done accordingly. It can be operated by one worker. Each machine can bend 4,000 forms per shift.

Another type has been adopted by the Third Working Area of the No. 6 Construction Company in Tientsin. It is suitable for processing ϕ6-10 millimeter steel materials. It is operated by one man. Each machine can process 4,000 forms per shift.

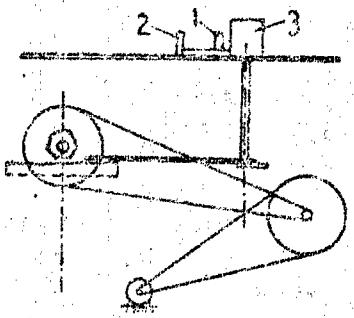

Figure 9
Small Form Making Machine A

1-steel post; 2-steel shaft; 3-movable pincers.

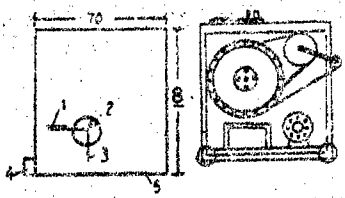

Figure 10 Small Form Making Machine B

1-steel plate; 2-steel shaft; 3-steel to be processed; 4-switch; 5-working platform.

9. Small Hoop Bending Machine

The small hoop bending machine is composed of a steel frame made of angle steel bars welded together. It utilizes the eccentric wheel to bend the steel material into a ring; thus, a steel hoop is made. The structure of the machine is shown in Figure 11. Generally, it is used to bend ϕ6-12 millimeter steel hoops. Its operation is similar to any common bending machine and it is operated by one man. Each machine can bend 1/4 ton steel materials per shift. Its efficiency is 2-3 times greater than that done by manual labor.

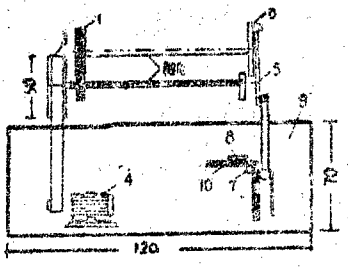

Figure 11 Small Hoop Bending Machine

1,2-gears; 3-leather belt wheel; 4-motor; 5-crooked lever; 6-eccentric wheel; 7-steel rod; 8-steel plate; 9-working platform; 10-finished hoop

10. Multiple Point Welding Machine

Utilize the original 75 volt welding machine and add a 2.8 kilowatt motor. Use angle steel bars to make

a frame and make use of eight eccentric wheels. Alternate the welding and then proceed to weld in a logical order. The structure of the machine is shown in Figure 12. It is operated by two men. Using a large ceiling panel as an example, each machine can produce 120 piecer per shift. Its efficiency is three times higher than that of manual operation.

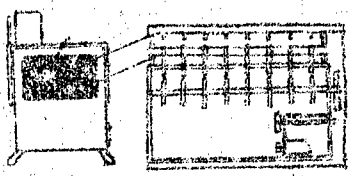

Figure 12
Multiple Point Welding Machine

1-copper pole; 2-copper pole; 3-eccentric wheel

11. Cold Drawing Machine

This home-made cold drawing machine is composed of an angle steel bar frame and other principal parts, such as winch, cylinder, switch device and a motor. Its structure is shown in Figure 13.

In operation, after having gone through the drawing process, a half millimeter diameter steel wire can b extended 2% in length and its strength greatly increase It is operated by two men. Each machine can process 0.5 ton per shift.

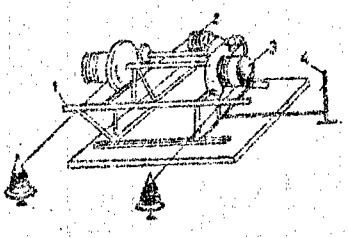

Figure 13 Cold Drawing Machine
1-wire drawing mould; 2-electrically powered machine;
3-winch; 4-switch device

12. Crane Shears Leg Working Platform

In order to facilitate the forming of the crane shears leg frame, steel plate and shaft bearing may be used, as shown in Figure 14. The platform is suitable for the formation of a crane shears leg 80-120 centimete high. Other heavy shears leg structures may also use it In operating, put the steel materials that are to be welded on the platform so that the crane shears leg will turn the steel materials in any direction that may be desired in welding.

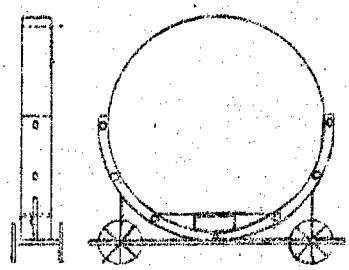

Figure 14

Crane Shears Leg Working Platform

1-steel plate; 2-contact welding plate;
3-shaft bearing.

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